

CLAIMS

What is claimed is:

1. A pesticidal composition, comprising:

5 a non-aqueous, water miscible solvent at least 20% by weight;
two or more plant alkaloids selected from the group consisting of
toosendanin, tomatine, stemonine, nicotine, anabasine, matrine, oxymatrine,
sophocarpine, N-oxysoxycarpine, cytisine, and aloperine,
wherein the composition is formulated to function as a pesticide.

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2. The composition of claim 1, wherein the solvent is selected from the
group consisting of triacetin, polyethylene glycols, polysorbates, poloxamers,
polyoxyethylene ethers, polyoxyethylated alkylphenols, copolymer of
alkylphenol epoxyethane and epoxyp propane, N-methyl pyrrolidone,
15 propylene glycol, ethyl acetate, dimethyl sulfoxide, dimethyl acetamide,
benzyl alcohol, 2-pyrrolidone, benzyl benzoate, C₂₋₆ alkanols, 2-
ethoxyethanol, 2-ethoxyethyl acetate, methyl acetate, ethyl acetate, ethylene
glycol diethyl ether, ethylene glycol dimethyl ether, and tributyrin.

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3. The composition of claim 1, wherein the solvent is polyoxyethylene
ether.

4. The composition of claim 1, wherein the solvent is polyoxyethylated
alkylphenol.

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5. The composition of claim 1, further comprising an extract derived from
a plant selected from the group consisting of *Anabasis aphylla*, *Nicotiana*
acuminata, *Duboisia myoporoides*, *Zinnia elegans*, and *Zollkofleria*
eliquiensis, which contains anabasine.

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6. The composition of claim 1, further comprising an extract derived from a plant that selected from the group consisting of *Melia toosendan Sieb. et Zucc.* and *Melia azedarach L.*, which contains toosendanin.

5 7. The composition of claim 1, further comprising an extract derived from *Lycopersicon esculentum* that contains tomatine.

8. The composition of claim 1, further comprising an extract derived from a plant selected from the group consisting of *Sophora flavescens Ait.*, and

10 *Sophora alopecuroides L.*, which contains matrine, oxymatrine, sophocarpine, and N-oxysohcarpine,

9. The composition of claim 1, further comprising an extract derived from *Sophora alopecuroides L.* that contains cytisine and aloperine.

15 10. The composition of claim 1, further comprising a plant alkaloid selected from the group consisting of ricinine, harmaline, stellerin, euphol, triptonide, tripdiolide, and triptolide.

20 11. The composition of claim 10, further comprising an extract derived from *Ricinus communis L.* that contains ricinine.

12. The composition of claim 10, further comprising an extract derived from *Peganum harmala L.* that contains harmaline.

25 13. The composition of claim 10, further comprising an extract derived from *Stellera chamaejasme L.* that contains stellerin and euphol.

14. The composition of claim 10, further comprising an extract derived

30 from *Tripterygium wilfordii hook F.* that contains triptonide, tripdiolide, and triptolide.

15. The composition of claim 1, further comprising an extract derived from *Radix stemonae* that contains stemonine.

5 16. The composition of claim 1, further comprising an alkaloid selected from the group consisting of aconitine, rotenone, and arteannuine.

10 17. The composition of claim 16, further comprising an extract derived from *Aconitum kusnezoffii reichb* or Common monkshood mother root that contains aconitine.

18. The composition of claim 16, further comprising an extract derived from *Derris trifoliata lour* that contains rotenone.

15 19. The composition of claim 16, further comprising an extract derived from *Herba artemisiae annuae* that contains arteannuine.

20 20. The composition of claim 1, further comprising a pyrethrin compound.

20 21. The composition of claim 20, wherein the pyrethrin compound is pyrethrin chlorocyanide.

22. The composition of claim 1, further comprising imidacloprid.

25 23. The composition of claim 1, further comprising a surfactant.

24. The composition of claim 23, wherein the surfactant is selected from the group consisting of polyoxyethylated sorbitan monoesters, polyoxyethylated aryl-alkyl alcohols, polyoxyethylated fatty acids, and

30 polyoxyethylated aryl-alkyl esters.

25. The composition of claim 1, wherein the concentration of the alkaloids is between about 0.1%-20%.

26. The composition of claim 1, wherein the concentration of the alkaloids
5 between about 1%-15%.

27. The composition of claim 1, wherein the concentration of the alkaloids between about 2%-10%.

10 28. The composition of claim 1, further comprising an acidifying agent.

29. The composition of claim 1, further comprising an alkaline agent.

30. The composition of claim 1, further comprising an antioxidant
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31. A method of protecting an object from harmful effects of pests,
comprising:
applying to the object an effective amount of a pesticidal composition
comprising
20 a non-aqueous, water-miscible solvent; and
two or more plant alkaloids selected from the group consisting
of toosendanin, azadirachtin, tomatine, stemonine, nicotine, anabasine,
matrine, oxymatrine, sophocarpine, N-oxysofocarpine, cytisine, aloperine,
harmaline, ricinine, stellerin, aconitine, rotenone, and arteannuine, euphol,
25 tripotonide, triptolide, and triptolide,
wherein the object is selected from the group consisting of a plant, an
animal, and a wooden structure.

32. The method of claim 31, wherein anabasine is extracted from a plant.

33. The method of claim 32, wherein anabasine is extracted from the plant selected from the group consisting of *Anabasis aphylla*, *Nicotiana acuminata*, *Duboisia myoporoides*, *Zinnia elegans*, and *Zollikoferia elliquiensis*.

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34. The method of claim 31, wherein toosendanin is extracted from *Melia toosendan Sieb. et Zucc.*

10 35. The method of claim 31, wherein tomatine is extracted from *Lycopersicon esculentum*.

15 36. The method of claim 31, wherein matrine, oxymatrine, sophocarpine, and N-oxysohcarpine are extracted from the plant consisting of *Sophora flavescens Ait.*, and *Sophora alopecuroides L.*

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37. The method of claim 31, wherein cytisine and aloperine are extracted from *Sophora alopecuroides L.*

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38. The method of claim 31, wherein ricinine is extracted from *Ricinus communis L.*

39. The method of claim 31, wherein harmaline is extracted from *Peganum harmala L.*

25 40. The method of claim 31, wherein stellerin and euphol are extracted from *Stellera chamaeiasme L.*

41. The method of claim 31, wherein stemonine is extracted from *Radix stemonae*.

42. The method of claim 31, wherein aconitine is extracted *Aconitum kusnezoffii reichb* or Common monkshood mother root.

43. The method of claim 31, wherein rotenone is extracted from *Derris trifoliata lour.*

5 44. The method of claim 31, wherein arteannuine is extracted from *Herba artemisiae annuae.*

10 45. The method of claim 31, wherein triptonide, tripdiolide, and triptolide are extracted from *Tripterygium wilfordii hook F.*

15 46. The method of claim 31, wherein applying the pesticidal composition to the object includes spraying the composition to the object.

47. The method of claim 31, wherein applying the pesticidal composition to the object includes injecting the composition to the object.

20 48. The method of claim 31, wherein applying the pesticidal composition to the object includes fumigating the composition and contacting the object with the fumigant.

49. A method of protecting an object from harmful effects of pests, comprising:
25 applying to the object an effective amount of a pesticidal composition comprising
a non-aqueous, water-miscible solvent; an extract of two or more plants selected from the group consisting of *Anabasis aphylla*, *Nicotiana acuminata*, *Duboisia myoporoides*, *Zinnia elegans*, *Zollikoferia eliquensis*, *Melia toosendan Sieb. et Zucc.*, *Lycopersicon esculentum*,
30 *Sophora flavescens Ait.*, *Sophora alopecuroides L.*, *Ricinus communis L.*,

Peganum harmala L. , Stellera chamaeiasme L., Radix stemonae., Aconitum kusnezoffii reichb, Derris trifoliolate lour., Herba artemisiae annuae., and Tripterygium wilfordii hook F.,

wherein the object is selected from the group consisting of a plant, an

5 animal, and a wooden structure.

50. A process for manufacturing a pesticidal composition, comprising:

extracting in an organic solvent two or more plants selected from the group consisting of *Anabasis aphylla*, *Nicotiana acuminata*, *Duboisia*

10 *myoporoides*, *Zinnia elegans*, *Zollikoferia eliquensis*, *Melia toosendan Sieb. et Zucc.*, *Lycopersicon esculentum*, *Sophora flavescens Ait.*, *Sophora alopecuroides L.*, *Ricinus communis L.*,

Peganum harmala L., *Stellera chamaeiasme L.*, *Radix stemonae.*, *Aconitum kusnezoffii reichb*, *Derris trifoliolate lour.*, *Herba artemisiae annuae.*, and

15 *Tripterygium wilfordii hook F.* at a temperature of extraction between 35-100°C;

filtering out solid residues to produce a liquid extract; and
retaining the liquid extract.

20 51. The process of claim 50, wherein the temperature of extraction is between 50-70°C.

52. The process of claim 50, wherein the organic solvent is ethyl ether, methanol or ethanol.

25 53. The process of claim 50, further comprising:
heating the liquid extract under vacuum condition until the volume is reduced by at least one third.

54. The process of claim 50, further comprising:

30 mixing the liquid extract with a water-miscible solvent.

55. The process of claim 54, wherein the water-miscible solvent is polyoxyethylene ether or polyoxyethylated alkylphenol.

56. The process of claim 54, further comprising:

5 mixing the liquid extract with a surfactant selected from the group consisting of polyoxyethylated sorbitan monoesters, polyoxyethylated aryl-alkyl alcohols, polyoxyethylated fatty acids, and polyoxyethylated aryl-alkyl esters.

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